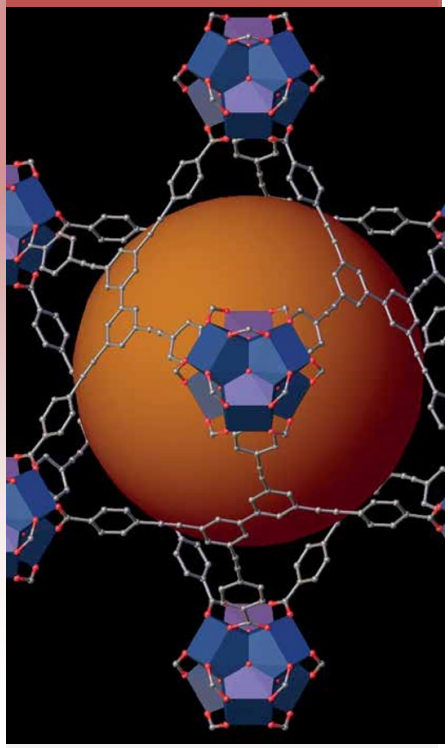
[Volume 1, Issue 1]

2016- 2017 Chemistry Newsletter



Metal Organic Frameworks (MOFS) are one of our schools' research strongpoints and the focus of our interview with Dr S. Nayak (pages 3 – 4)

Welcome to our First Issue

Welcome to the first issue of our newsletter. As 2016 fades (an important year for Chemistry at University of Bradford as Professor Rimmer reflects on below) we look back over a year of change and the imminent establishment of an exciting extended School that will make the most of the strong links between Chemistry and the Biosciences. Over the coming months we will bring together some of our leading Biologists with our fast developing teams of Materials Chemists and Chemical Biologists, here at Bradford, as we embark on forging a strong progressive School with the ability to tackle some of the biggest issues facing the world today. Given the advances that we have made in Chemistry we intend to focus on this area in this issue but even here you will see key interactions with the Life Sciences already evident. Here we celebrate how far we have come over the past 18 months and we provide the first of a series of exclusive extended interviews with our staff, Dr Nayak, conucted by our own chemistry students.

Prof Rimmer 'One Year at Bradford'

The 1st of May 2016 was important for many reasons. Firstly, it marked one year of my time as Head of School of Chemistry and Forensic Science. This first year was an exciting time for many reasons and set the foundations for a time of great change both at Bradford and throughout UK Chemistry. Chemistry is the central science and our understanding of the molecular & nano world governs our interactions with the world around us. From a personal perspective it has been very gratifying to observe how efficient and effective the team in Chemistry are here at Bradford, and I know that all are impressed at how quickly the academic and administrative teams have brought about the revisions. We hope that our ethos of attention to fundamental principles of chemistry in early years, coupled with specialization in multidisciplinary studies focused on the key employment sectors, will be extremely popular with both students and employers. Dr Martin sets out our new courses further on in this newsletter and further developments are in the pipeline to be announced next year. *Article continued on page 2*

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One Year at Bradford Continued

Continued from page 1. Excitingly the new academic year in September saw six new lecturers joining the Chemistry staff, the largest increase in this School's history for many years. On the research front it soon became very clear that the School had very major strengths in Inorganic Chemistry and Nano Materials Chemistry and with my group we had excellent coverage of the whole area of Materials Chemistry. It looked like we just needed a few key appointments in Polymer Physical Chemistry to be able develop a major UK Centre in Materials Chemistry and of course at Bradford we have the major advantage of being next door to the Polymer Engineering group. Now Materials Chemistry forms a major part of our research strategy and also a new MSc will be launched in this area in 2017 alongside the revamped Msc programme in Analytical Chemistry. This year also saw the departure of Dr. Xianfeng Chen (off to University of Edinburgh) and Prof. Frank Leusen (who will be sorely missed) and our thoughts are with his family. Looking ahead 2017 will bring new challenges to our new, growing, revamped school but we will continue to offer the excellent chemical research and teaching as before. *Prof. S. Rimmer.*

'Six new lecturers joining the Chemistry staff, the largest increase in this school's history for many years'

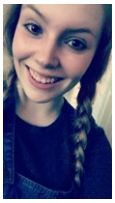
Royal Society of Chemistry

Any chemist in the UK should consider becoming a member of the RSC; this is our professional body. Our students can join the RSC as associate members during their studies and we are an active part of the local RSC section. Our degrees are fully revamped for the modern world and RSC accreditation requires us to have graduated students from these courses. Our new schemes have been carefully designed to contain all of the important elements for accreditation and the University of Bradford is fully committed to providing all of the necessary resource to achieve RSC accreditation at the earliest opportunity. This means that our intention is that students graduating from a start in October 2016 will receive RSC accredited degrees. Meanwhile all of our new students have been offered complementary membership for 2017.

Chemical and Forensic Society (CFS)

The Chemical and Forensic Society is an RSC recognised group which organises social and academic events throughout the year for everyone who studies in the School of Chemistry and Forensics at the University of Bradford. Joining CFS is an excellent way to socialise with fellow course members from all stages. CFS aims to improve course engagement and help students ease into university life by creating a platform allowing students to socialise and share common interests outside of the academic environment. Being a member of the society has many incentives such as a membership card, cheaper tickets for events, a society hoodie and it allows you to have a say on issues raised in the society.

On the 7th of April 2016, elections were held to gather the executive team for the 2016/2017 academic year. So, let's meet the team who will put the cogs in motion!



President
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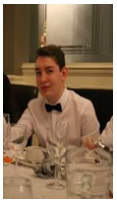


Public Relations
Jake Hood

This selection of 2nd to 4th year students have a range of passions outside of the school including following Preston North End, Archery, BUSOM and the university snowsports teams. They will be running a variety of student events throughout the year (see Page 5) and we look forward to working with them and their successors in 2017/2018.

Staff Profile: Dr Nayak

Doctor Sanjit Nayak, Lecturer in Chemistry, is interviewed by Ellen Castley, Holly Illing, Lucy Lumsdale & Jaimin Mistry.

Dr. Sanjit Nayak has been an academic in the School of Chemistry and Forensic Sciences at the University of Bradford since July 2014. He completed his BSc in Chemistry (Honours) at the University of Burdwan followed by his MSc at the Indian Institute of Technology in 2005. He travelled to Germany to complete his PhD on supramolecular chemistry under Professor Annie Powell's supervision at the University of Karlsruhe. The first half of his PhD he worked on Biomineralization of calcium carbonate and in the second half he focused on an entirely different area of coordination chemistry to develop single-molecule magnets which was combined to form his PhD in 2008. Following this he spent a year in Leiden University in the Netherlands to work with Prof. Jan Reedijk and two years in Marburg University to work with Prof. Stefanie Dehnen in Germany as postdoctoral research associate. He was awarded the prestigious Marie Curie Intra-European Fellowship to work as a postdoctoral research associate at University of Liverpool with Prof. Matthew Rosseinsky. His first independent job was as a chemistry instructor at the National University of Singapore for one and a half years before making the journey to the University of Bradford.

What brought you to Bradford and what do you like the most?

I came to Bradford to bring my research together with my teaching following on from my teaching experience at the National University of Singapore. I was fascinated with how Bradford linked research with lectures to engage students with contemporary cutting edge research. The university has well-equipped Analytical Centre which is suitable for high quality research, and unlike many universities the students get hands on training on the equipment and have unlimited access which is extremely important for research and student training. All these were in line with my view on a combined career in research and teaching and thankfully the opportunity arrived at a perfect time in my career, I was successful and I enjoy my research and teaching here in Bradford.

What sparked your interest in chemistry?

It's definitely coordination chemistry which I am lucky to teach to undergraduate students on a regular basis. I like it as there is a lot of applications of coordination chemistry; for example, catalysis, magnetism etc. This is an enormous field, and if you look around you will find many examples of coordination complexes. Unlike other areas of chemistry, coordination chemistry is perhaps attractive by itself from the beautiful colours of the coordination complexes!

Could you give us a brief summary of your current research?

Most of my research is based on coordination chemistry, and its applications in developing new materials with interesting properties, like magnetism, catalysis, gas storage, etc. We have recently developed a highly porous material, UBMOF-31 (UBMOF = University of Bradford Metal Organic Framework) with excellent hydrogen storage properties. You've caught me on a good day, our paper was recently accepted in Chemical Communications. The material was synthesized by a student (Ayesha Naeem) who completed her MChem last year. It looks at the possibility of hydrogen gas storage which is important today as fuel is running out and developing countries are using more energy. Hydrogen is the most promising alternative energy because it produces only water as an enviro mentally benign by product. Hydrogen can be obtained by the splitting of water and can then be burned to produce energy. However, it's not easily stored as it is very light and boiling point is extremely low (20 K). …*Continued on Page 4*

UK-India MRC for Minimizing Antimicrobial Resistance

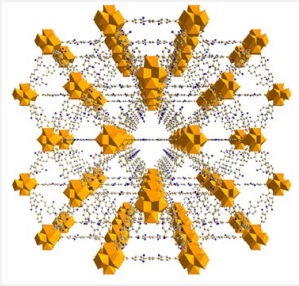
Perhaps the biggest issue facing mankind from now for the next 100 years is the developing resistance to antibiotics. Many reports are available from WHO and most national health organizations pointing to the catastrophic consequences of a failure to stem the descent further into the post-antibiotic era and it is clear that Chemists, along with other scientists, must engage with this global issue. The key challenges include: developing new drugs and therapies; new diagnostic techniques and ensuring further developments in hospital and community practices.

Here at Bradford we work in close collaboration with clinicians in India and microbiologists in University of Sheffield to develop novel diagnostics, drug delivery systems and polymeric versions of known antimicrobials The juxtaposition of the UK and India in terms of clinical and socio-economic environments provides a fetile ground for developing new technologies. The first two UK-India workshops in a series sponsored by MRC and DBT were held in 2016 and the presentations and key outputs can be download for free from our repository Bradford Scholars.

Zirconium MOFs

We would like to thank Dr. Nayak for his time and a copy of his most recent publication, as mentioned in the article, can be found on the RSC's website under ChemComm (DOI: 10.1039/C6CC03787A).

Next issue we will release our second interview also carried out in 2016 with Dr. S. Hickey alongside further news from the school.



UBMOF-31: A zirconium based microporous metal-organic framework with excellent hydrogen uptake capacity as described in our interview with Dr Nayak

Longitude Prize Discovery Award

Recognising our international work on Antimicrobial Resistance we have been honoured to receive a Discovery Award from the Longitude Prize board. The award, given to Professor Stephen Rimmer and his team, is a stepping stone to further developing research work to compete for the Longitude Prize, a £10m prize fund that will reward a competitor who can develop a point–of–care diagnostic test that will conserve antibiotics for future generations and revolutionise the delivery of global healthcare. Professor Rimmer and colleague Dr Tom Swift received the award at the Royal Society in London in November.

Inside Story Headline

Professor Rimmer listens to Sir Martin Rees, the Astronomer Royal, describe the history of the Longitude Prize at the Royal Society

'This is probably something that I have dreamed of since a long time and even as a child I asked "what would happen if you could burn water?"

Interview Continued

Continued from Page 3… If you wanted to run a car on hydrogen you would need a huge storage tank which is not efficient. To store hydrogen you need a material with a high surface area similar to what we have described and working on.

Inside Story Headline

This is an outstanding publication but which one means the most to you?
Maybe the first one, as the first one is always your favourite! You get the satisfaction which is quite indescribable. My PhD supervisor was very kind and we got a cover page article!

What do you hope to achieve in your field?
I want to develop some material that can be used to split water efficiently so that we can use the evolved hydrogen as one of the main resources for energy, which would make the world sustainable. This is probably something that I have dreamed of since a long time and even as a child I asked "what would happen if you could burn water?" and to this day, I still get teased about it by my relatives!

Aside from chemistry, do you have any hobbies?
My number one hobby is travelling. I travel a lot and next on my list is Iceland! Also, I enjoy listening to music, especially Mozart, Vivaldi, and Andre Rieu to name a few. I also like to play badminton, cooking, gardening, and photography. Unlike research where progress takes a long time, I find cooking is one of the most joyful things as there is an instant happiness in cooking for friends. It's a great way to get rid of stress and being productive at the same time!

If you didn't go into chemistry, which career would you have chosen?
I might choose to be a wild life photographer that could combine my travelling and photography hobbies together!

- *Interview by E. Castley, H. Illing, L.Lumsdale & J. Mistry.*

Doctor Maria Katsikogianni addresses the workshop audience in Chendu, China

Chinese Society for Biomaterials

In December new chemistry lecturer Dr Maria Katsikogianni attended the British Council/NSFC Newton Early Career Researcher Workshop on Healthcare Technologies for Aging Populations, that was facilitated by Professor Phil Coates, Director of the Polymer IRC, in Chengdu, China. This most successful Research Links Workshop brought researchers from 10 UK Universities together with researchers from 5 Chinese Universities to share each other their excellent work and expertise and to look actively for new collaborations in healthcare technologies for aging populations, a crucial area to both China and the UK. The Workshop provided an excellent platform where the researchers worked hard to create innovative ideas based on their research strengths and the complementarity of their work. The researchers had also the opportunity to visit the National Engineering Research Centre for Biomaterials (NERCB), Sichuan University and to initiate discussions about research areas of common interest. Dr Katsikogianni found the workshop an excellent opportunity for collaborations in the area of Biomaterials and she will explore this further in the New Year.

Professor Leusen

It is with sadness that we announce the death of Professor Frank Leusen, Professor of Computational Chemistry. Frank passed away at the Marie Curie Hospice in Bradford on Sunday December 4th after a battle with cancer. Frank studied for his B.Sc. in Pharmacy and M.Sc. in Bio-Pharmaceutical Sciences at the University of Leiden, the Netherlands and he received his Ph.D. in Chemistry from the University of Nijmegen, the Netherlands, where he studied the crystallisation behaviour of diastereomeric salts in order to develop a predictive model for racemate resolution. After working as a research consultant for Novartis AG in Basel, Switzerland he joined Molecular Simulations Ltd in 1993, starting a prestigious career that led him to the University of Bradford in 1993. He joined as Senior Scientist in the Institute of Pharmaceutical Innovation. He joined the Division of Chemical and Forensic Sciences in 2009, and in 2013 he was appointed as Professor of Computational Chemistry. In addition to contributing to the research outputs of the university with over 70 publications, Frank was active within the School of Chemical and Forensic Sciences, developing innovative teaching provision in Computational Chemistry at both the Undergraduate and Masters degree levels. Frank's all-round contribution to the life of the School and University will be greatly missed.

Students walking with Lecturing Staff at the start of the semester

Social Activities

Social Activities at the University are an important part of any school or department. 2015/2016 held many successes for the CFS society however there is so much more the executives wish to accomplish next academic year. Several successful events such as the annual Christmas party, the pizza "Meet-n-greet", and the Fresher's Fayre were enjoyed by many. The society being awarded the silver medal in the inaugural "Societies Quality Mark" scheme was a massive achievement and the committee aim to take home the gold this year. Collaborations are going to be a huge part next year, especially with the STEM society, who recently joint hosted a mock crime scene investigation with CFS. Both teams competed to solve a murder case

Students attend evening seminar and games night following introductory speeches from new Lecturers.

New Materials MSc

Materials are the fabric of our modern world and have been key to our development since ancient times. Natural materials, such as leather and wood, were first used in prehistoric times and the passing of ages are usually defined by the types of materials available; stone age, iron age, bronze age etc. In modern times the industrial revolution brought the dawn of the polymers age and in the 21st Century new materials are still being produced by chemists while established materials are being produced in better and more efficient ways. Many of the new materials have functions beyond the familiar structural and mechanical roles of commodity materials. Importantly, much of the modern chemical industry is involved in production of materials and the design of new materials; for example, approximately 50 percent of all chemists in industry work with polymers. As you can read in this newsletter other new materials, such as MOFs, are being used to provide clean energy amongst other important applications.

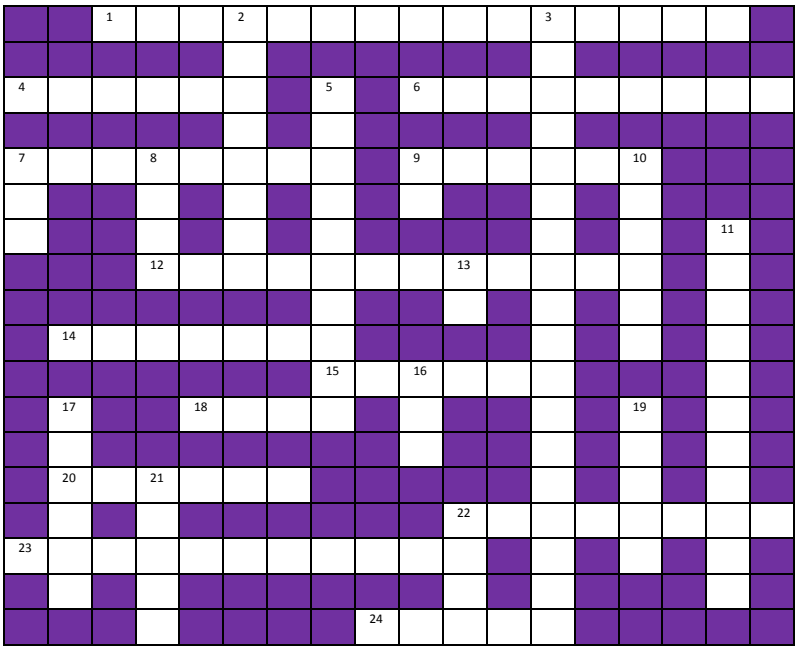
Materials Chemistry is a multi-disciplinary new subject that crosses traditional boundaries. Materials Chemists have strong skills in organic, inorganic and physical chemistry and they are in demand in both academic and industrial laboratories.

Our new MSc in this area is one of the few courses available that provides a broad knowledge of the Chemistry of Materials and uniquely the course offers a full year of research training as well as formal lectures. Students will join a leading research team in the area and the course provides both a strong back ground in the theory of materials chemistry and a sound research training (including project planning and writing of scientific papers) as a prelude to PhD studies or work as industrial research or development scientist.

Find out more and apply online.

Organic Chemistry Crossword

Test your organic knowledge with one of RSC's chemistry crosswords!



Across

1. Mostly responsible for the chemistry of an organic molecule. (15) 4. A reactive covalent bond. (6) 6. The type of alcohol with the group, -CHOH-. (9) 7. The third member of the aliphatic aldehyde series. (8) 9. A major constituent of Scot pine oil. (6) 12. Seeks electrons to form a covalent bond. (12) 14. A simple aromatic molecule. (7) 15. A good hydrogenation catalyst. (6) 18. High melting polyethene. (4) 20. A molecule containing the -CO- group. (6) 22. The major constituent of the oil from orange peel. (8) 23. This term applies to the alkenes. (11) 24. These are good examples: methane, propane, butane and ethanol. (5)

Down

2. A constituent of the fragrance of ophrys orchids, highly attractive to pollinating bees. (8) 3. But-2-ene has a couple of these. (18) 5. Can be made by heating ethene to a high temperature under pressure. (10) 7. Polyethylene terephthalate (abbrev). (3) 8. Made by polymerising tetrafluoroethene (abbrev). (4) 9. Polymerise phenylethene (abbrev). (2) 10. A molecule of this compound has two carbon atoms and four hydrogen atoms. (6) 11. These organic substances can be synthesised by reacting alcohols, under suitable conditions, with a variety of halogen containing compounds. (11) 13. Polymerised propene (abbrev). (2) 16. Opposite of trans. (3) 17. A saturated hydrocarbon. (6) 19. A compound which contains nitrogen and can be synthesised by refluxing a halogenoalkane with ammonia in alcohol. (5) 21. The most stable geometrical isomer of but-2-ene. (5) 22. This manufactured by heating ethene to a high temperature and pressure in the presence of oxygen catalyst. (4)

If you would like to know more about CFS society or have ideas on what you'd like to do please get involved. Membership price is £3 and people who joined at the last fresher's fayre received an element cupcake for joining. Alternatively you can email them - CFSBradford@gmail.com, Tweet us - @UBU_CFS & see our Facebook page – UBU Chemical Forensic Society.

Issue Editor: Dr. T. Swift
Contributions from Prof. S. Rimmer, Dr. S. Nayak, Dr. W. Martin, Dr. S. Hickey, Dr J. Kendrick, Dr. M. Katsikogianni, E. Castley, H. Illing, L.Lumsdale & J. Mistry.